The CHEMIST

OCTOBER, 1942 VOL. XIX, No. 7

The CHEMIST

Publication of
THE AMERICAN INSTITUTE OF CHEMISTS, INC.
V. F. KIMBALL, *Editor*, 233 Broadway, New York City

VOLUME XIX OCTOBER, 1942 NUMBER 7

THE AMERICAN INSTITUTE OF CHEMISTS
HOWARD S. NEIMAN, *Secretary*
233 Broadway
New York, N. Y.

Entered as second class matter April 8, 1936, at the Post Office at New York, N. Y., under Act of August 24, 1912.

Issued monthly except in June, July and August at 233 Broadway, New York, N. Y. Subscription price, $2.00 a year. Single copy, this issue $0.25

CONTRIBUTING EDITORS (Continued)

IN THIS ISSUE

Support The Membership Drive

This is the heyday of the chemist. It is the day of his greatest opportunity. He is a factor of tremendous importance in the war; in fact, he carries one of the keys to victory.

Recognition of the chemist's high estate is growing, but greater heights are yet to be attained.

After he has finished his war tasks, devoted to smashing the enemy, he will face a multitude of jobs when the peace comes.

In wartime, research, development, discovery and invention speed forward with giant strides. Thus, the end of the war will see the chemist in possession of greater facilities than he ever enjoyed before to lengthen and make more profitable the life of man.

Every individual chemist can accomplish much by his own efforts but in association with others his power for achievement is multiplied many times.

In order thus to multiply his ability and to promote the recognition to which he is justly entitled, every qualified chemist should join The American Institute of Chemists.

Members of the Institute appreciate its value. Let every member take it upon himself to share its benefits with at least one chemist now outside the fold.

How? By bringing in at least one member to the Institute before January first, 1943.

Gustav Egloff

The Chemist In Three Wars

What chemists have done in previous wars. What American chemists are doing — *and not doing* — to help win the present war. A paper read before The American Institute of Chemists at Chicago, September 18, 1942.

***By* Otto Eisenschiml**

President, Scientific Oil Compounding Company, Chicago, Illinois

I

THE CIVIL WAR

AT THE beginning of the Civil War chemistry was in its infancy. The chemical requirements of armies at that time, were, of course, proportional to the world's contemporary scientific standards; they comprised in the main the procurement of a few basic materials such as iron, copper and saltpeter; among manufactured products, gunpowder was the most important. Small as these demands appear when compared to those of modern fighting forces, they constituted problems of magnitude for the chemists and industrialists of the time.

The agricultural South, having built its economic structure on cotton, found itself in a precarious position at the outset of the conflict. According to census figures for the year ending June 1, 1860, the United States had produced in twelve months 884,474 tons of pig iron; out of this total the South, represented only by Tennessee and Virginia, had contributed a mere 25,513 tons. The blast furnaces in the South were small and antiquated; a daily output of thirteen tons, reached by newly erected furnaces in Alabama, was considered a decided improvement over the older plants of Virginia and Tennessee. The methods used were obsolete, chemical control unknown. In many cases iron ore and fuel had to be brought from distant places by a dilapidated railroad system or by teams; nevertheless, the Confederacy is said to have produced 50,000 tons annually during the war—a remarkable achievement, especially in view of the fact that, as the Northern armies advanced, many furnaces had to be abandoned. To augment the supply,

collection of scrap iron was instituted early in the war, much along the lines we follow today, with Richmond appealing to her patriotic citizens to give up their "broken or worn-out ploughs, plough-points, hoes, spades, axes, broken stoves and kitchen utensils" against adequate compensation.[1] Similarly, lead was collected successfully from various sources. 200,000 pounds were gathered from window-weights in Charleston alone, and a like amount was obtained from lead pipes in Mobile. Large amounts of lead were also systematically recovered from battlefields, and the government paid high prices for the metal so collected.

The only copper mines available for exploitation were located in Tennessee, and these passed into Union hands soon after the beginning of hostilities. Copper was sorely needed for bronze field-guns and for percussion caps. In this exigency, the South bought up turpentine and apple-brandy stills, which were made of copper and of which there was an abundant supply. By stopping the casting of bronze guns and limiting the use of copper to the manufacture of caps, a shortage of this metal was avoided.

In regard to saltpeter the South was relatively better off than her adversary. There were deposits in limestone caverns near Columbia, Charleston, Savannah, Augusta, Mobile and Selma. These were mined under supervision of a special government agency called the Nitric and Mining Bureau. Less than one half of the saltpeter needed was procured in this way; the rest came from other domestic sources and through the blockade.

The direction of all chemical activities in the South was in the hands of three men, to whose energy and ingenuity history has accorded but scant recognition. To earn the world's applause, heroes must—as we chemists know only too well—do something more spectacular than provide their country with sorely needed products, even if it is military ordnance for hard-pressed armies at the front. These three men, on whom nearly as much depended as did on Robert Lee and Joseph Johnston, were Josiah Gorgas, Gabriel J. Rains and John Wm. Mallet. General Gorgas was a Pennsylvanian by birth and had graduated from the U. S. Military Academy in 1841. As an officer in the ordnance office of the United States Army he had shown such outstanding ability that Jefferson Davis appointed him chief of ordnance of the Confederacy as early as February 1861.[2] He was an organizer of the highest type,

possessed of courage, initiative and a driving force that overcame the most discouraging obstacles. General Rains was equally dynamic, resourceful and persevering. Born in North Carolina and graduated from the U. S. Military Academy class of 1842, he was a resident of New York in 1861, but joined the Southern forces as colonel of infantry in March of that year. In September he was made brigadier general and fought with distinction at Shiloh, Perryville and Seven Pines, where he was wounded. But his ability as a chemist was soon recognized, and he was asked to turn his energy from leading troops on battlefields to the less colorful but equally essential task of creating a chemical industry.[3]

The third man of this small group was John William Mallet, an Irishman educated at Trinity College, Dublin, and at Goettingen, Germany. He had taught chemistry at Amherst and at the University of Alabama in the decade preceding the war and was made superintendent of the ordnance laboratories at Macon, Georgia in 1862. One of his principal assignments was the procurement of mercury for the Southern arms, which proved difficult without any native sources of quicksilver. Mallet remedied this shortage, at least partially, by ordering the breaking up of all thermometers and barometers throughout the South. After the war, Mallet became professor of chemistry at the University of Virginia, and in 1882 was elected president of the American Chemical Society.[4]

In 1861, this trio of chemical engineers faced a desperate situation. Only two of the country's powder mills were located in the South, one in South Carolina, built for the sole purpose of furnishing powder for blasting a tunnel, and one at Nashville, which was exposed to enemy attack. The South Carolina plant employed a crew of three men, the one at Nashville a crew of ten. Both together could produce scarcely enough powder for anything more than frontier skirmishes.[5]

Gorgas immediately took steps to put the manufacture of powder on a solid and broad basis. With Rains in actual charge, a large mill was started at Augusta, Georgia, in September 1861; operations began seven months later. The Augusta plant remained the chief reliance of the Confederacy until the end of the war and furnished all the powder needed, and of the finest quality. Rains even found time to improve the chemical processes. He introduced, for example, the method of steaming the mixed ingredients for gunpowder just before incorporation in the cylinder mills, which greatly increased the output, besides bettering

the quality. When peace came, the Augusta plant was considered one of the most efficient in the world.

As the war progressed, Southern soldiers walked without shoes, lived on parched corn, went in ragged uniforms; but they always had enough ammunition, thanks to the unflagging efforts of Gorgas, Rains and Mallet, who never failed them.

The North, although more highly industrialized at the beginning of the Civil War, also had difficulties in procuring certain products, particularly saltpeter, all of which had to be imported from India. The ordnance department had let its supplies run low, and in the fall of 1861, even before much large scale fighting had taken place, a serious shortage of this critical material developed. Lammot DuPont, the youngest member of the DuPont family who owned the large powder plant in Wilmington, Delaware, was the outstanding chemical genius north of the Mason and Dixon Line. Lammot, then only thirty years old, had graduated from the University of Pennsylvania as a chemist at the age of eighteen. Six foot two, lanky, big-boned and gifted with an iron determination, he soon became a leader in the powder industry. After the end of the Crimean War, he went to Europe to study the latest advances in the art. Before going on this trip, however, he had perfected and patented a process by which Peruvian sodium nitrate could be used for blasting powder in place of saltpeter. This invention, and the work leading up to it, was destined to become a matter of national importance in the not distant future.[6]

When young DuPont became aware of the acute shortage of saltpeter and speculated on its portentous consequences, he asked for and was granted a conference with the Washington authorities; immediately afterward he sailed hurriedly for England to buy large quantities of saltpeter. He arrived there in November, and in a few days had acquired some 2000 tons. Just when the four ships on which the material was loaded were ready to sail, reports of the *Trent* affair reached London. The British mail boat *Trent* had been stopped on the open sea by a U. S. warship and, contrary to international law, two prominent Southern passengers, John Slidell and James Mason, had been forcibly removed as prisoners of war.

The British government, greatly incensed at this high-handed—and unauthorized—procedure, lodged a violent protest in Washington, asking for surrender of the two Confederates and an apology for their

seizure. To show that her government was in earnest, the Queen declared an embargo on all munitions, and DuPont's boats with their precious loads were prevented from sailing. Excitement ran high, both in Great Britain and the United States. The British ambassador, on December 23, handed President Lincoln an ultimatum, to be answered within seven days. War between the two great English-speaking nations appeared imminent.

In the meantime, Lammot DuPont had returned to America and was in Washington on December 26th. What transpired there is not a matter of record, but can easily be surmised. If the Federal government could not get saltpeter from England or her possessions, the war was at an end. Wars could not be fought without powder, and powder could not be made without saltpeter. On December 30, 1861, Lincoln ordered the unconditional release of the two Southern emissaries. It was an unpopular decision but, although the public remained ignorant of his motives, the President had hardly any choice in the matter.

This little-known backstage setting to one of the Civil War's most stirring episodes had far-reaching consequences. Lammot DuPont was determined not to let the country be caught again in a similar critical situation. From Indian saltpeter he turned to the sodium nitrate deposits of South America, and succeeded even during the war in broadening the scope of his patented process so as to make it applicable also to the manufacture of gunpowder. The Indian monopoly was broken. From then on the United States ceased to depend for its supply of saltpeter on a European nation or her colonies.[7]

Thus the Civil War laid the foundation for the industrial development of the South and, still more important, for the military self-sufficiency of the United States. If wise leadership were to follow, the lessons of the fratricidal slaughter, learned at such bitter cost to both sides, would not be forgotten. The recent past was even then foreshadowing the events of the future. A big war, it was clearly shown, was no longer a mere clash of armed forces; it was a struggle between peoples and entire economic systems, essentially not much different from the competitive struggle between two large business enterprises. The South

had starved in the midst of plenty because of its broken-down transportation and finances; the North had almost lost through poor management of its supply department. There was ground for hope that the re-United States would not allow a repetition of similar blunders, and that no attack would ever again find the war department without a thoroughly prepared, all-embracing business organization and an abundance of the most vital sinews of war.

II

THE FIRST WORLD WAR

The first World War was characterized by one chemical achievement of such overwhelming interest that it outweighed all others. I am speaking of gas warfare. Aside from its novelty in modern combat, the introduction of this weapon carried with it the germ of a thought which, if it had been properly understood and interpreted, might have changed our entire conception of and preparation for warfare in general. Unfortunately for us, the Germans did develop the thought, and thereby gained an incalculable advantage over her opponents in the present world conflict.

I am not going to discuss at length the pros and cons of whatever moral issues may be involved in the use of poison gases. My personal opinion that gas warfare is no more evil than any other kind of human slaughter is, I believe, shared by most chemists. Attempts to outlaw it are bound to end in failure. Technical progress, whether for good or evil, cannot be undone. Even if outlawed, the fear that the enemy will do the unlawful, would force us to keep all our knowledge and preparations up to date. The world has looked in turn upon arrows, Greek fire and gunpowder as illegitimate methods of combat and has tried to suppress them. Only twenty-five years ago, many voices were clamoring for the abolishment of submarines. No one advocates their abolishment today. Nations in mortal danger have always ignored peacetime treaties, for war itself is a denial of all laws and agreements. *Silent leges inter arma*, as the Romans put it, "when the arms speak, the law becomes silent." Two men on a rock-bound island fighting for the last crumb of bread or drop of water do not follow Marquis of Queensberry rules. But this is beside the point. The thought I have in mind tends in a different direction

When the idea of a gas attack, on which German laboratories had worked for some time past, was first submitted to the German High Command, it was received with disdain. The graduates of Potsdam thought they knew all about warfare and wanted no advice from outsiders. It is said that only personal intervention by the Kaiser brought about a change of heart among the commanding generals. Nevertheless, they immediately set out to sabotage the plan, whether through lack of capability or malice is immaterial. The proper procedure would have been to call a conference of their leading chemists, inventors, military officers and business executives—the best brains of the country—to discuss the possibilities of this gas plan and perfect it before putting it to use. The businessmen, if men of vision, would no doubt have voted against its immediate adoption. Let there first be found a gas that was less visible, less odorous and not as easily identified as chlorine. Even a poker player would have advised against tipping a hand that held great possibilities, but still had to be played.

Months would have passed. Then the chemists would have submitted their improved product, phosgene. Invisible, insidious, highly poisonous, it would have broken the Allied front; for no soldier can stand up against a weapon they cannot see and against which there is no defense. Of course, the attack would have to be carried out on a long front, one hundred, two hundred miles at least, and be sustained by a full onslaught against the incapacitated or demoralized opponents. What if victory were achieved by means called unfair or even illegitimate? The world had a way of bowing to the victor, regardless of the means he had employed. One had only to read history for confirmation of this fact.

But the decision was not put into the hands of a board with vision; instead, it was left in the hands of men who had only the narrow viewpoint of the German military caste. Like the hungry man to whom a good fairy granted one wish and who asked for a meal when he could have asked for a King's ransom, the Germans made their gas attack on a three-mile front; they killed 5000 Frenchmen and French colonials, injured 10,000 and captured 6000 more. That was all. There were not even enough German troops in reserve to march through the breach to the English Channel, which they could have done.

This happened on the 22nd day of April, 1915. On the 23rd,

100,000 gas masks, hurriedly made from cotton pads saturated with reducing agents and chlorine-reacting compounds, were on the Allied front. The great peril was past. Germany's chemists had presented their country with a great opportunity to win the war with one stroke, and the general staff had exchanged the gift for a mess of pottage.

From a far-off perspective, this first modern gas attack deserves a much closer study than it seems to have received. Reduced to its simplest terms, this had been the problem. A big business concern, called Germany, had been offered a new invention that would speed up its output, in this case the killing or disabling of enemy troops. As in the case of any other invention, she asked her specialists to pass on its technical merits. The chemists approved. There was a gas called chlorine that could be taken to the front and used to kill people. The supply or manufacturing department affirmed its ability to produce chlorine cheaply and in large quantities. The invention was now submitted to those who had to use it, the plant managers and engineers, or in war, the general staff and the front line officers. They agreed, reluctantly and with understandable professional pride—or perhaps jealousy—that the proposed new method was feasible; their main objection probably was that existing methods were satisfactory, and that the situation was well in hand. Now the invention should have been passed back to the board of directors, the big keen brains of the enterprise. Here was an invention that could not be patented nor kept secret for any length of time. What was the best policy to profit by it? Disregarding the character of the novelty, the directors would ask several pertinent questions. Could the invention be easily imitated? It could. Why not wait then until it was made more complex before putting it on the market? And when it was time to sell the article, let it be turned out in such big quantities, that competitors would be swept off their feet, and be out of the running before they could catch their breath. But the business firm called Germany had no board of directors; and having no board of directors, she missed her one golden opportunity to win the war.

In principle, there was no great difference between a novelty to be sold to the public and a new weapon called poison gas. Germany lost the first World War because she did not recognize that war had become Big Business; hence she had no board of directors to conduct the war in a businesslike fashion. An invention which would have swung the

balance was there, but its use was left to the discretion of one single department which muffed it. It was as if a big steel company would leave a question of fundamental policy in the hands of its distributing agents. They would be consulted, of course, but they would not be asked to carry the responsibility; for the introduction of new processes involves more than mere technical sales ability; it involves questions of finance, tariffs, patent laws and others that can only be weighed efficiently by shrewd and experienced groups of masterminds, not by specialists in any one line, no matter how brilliant. The proper utilization of poison gas was neither a purely chemical nor a purely military problem. In its larger sense it was a business problem, and its solution should have been left to the shrewdest business minds of the nation.

* * *

In its primitive stages war was a clash of brute force against brute force. By and by weapons were devised and improved, and those with novel arms were the most successful. The waxed bow of the Northern tribes, the short sword of the Romans, showed that technical ingenuity had its rewards even in the early stages of warfare. The men of the Macedonian phalanx were forerunners of our shock troops, the elephants forerunners of steel tanks yet to be invented. At the same time, strategy began taking the place of mere brawn. In spite of these developments, however, war was still largely a matter of soldiering. Just as the owner of a primitive iron furnace was his own chemist, engineer, salesman and credit department, so the primitive general embodied in his own person all the knowledge and ability necessary to organize, arm and lead his troops.

The graduates of Potsdam were finely educated soldiers, but they still thought of war in terms of rifles, siege guns, local strategy. They failed to recognize that modern wars had grown beyond the art of soldiering and had become an enormous business enterprise which they were not trained to conduct.

The German High Command did not properly evaluate what chemists could do, because they lacked the vision and experience of keen and successful businessmen. It was not they who failed; the system failed which they served. One simple businessman, unable to tell a machine gun from a revolver, but shrewd in the ways of the competitive world, sitting in conference with the military officers, might have kept them

from the elementary error they were about to commit. His advice could have changed the course of history. But to have such an outsider take part in military discussions is something the German High Command would have considered ridiculous.

* * *

The first World War demonstrated that chemical ideas, properly utilized, can win wars. This does not mean, of course, that chemists alone can win them without co-operation from others. In order to win a war by means of a startling invention, or at least help win it, a co-ordination of four different types of mentality is needed, and they must work in harmony, like a well-organized athletic team or the integrated parts of an aggressive business enterprise.

First, we must have the imaginative type which envisions things that have never happened before; not visionaries who dream of perpetual motion, but minds that can visualize a gas adapted to warfare and base their dreams on sound chemical and physical principles.

Second, we need the specialist, the expert in the field to which the proposed invention belongs and who is competent to judge which dreams may be reasonably expected to come true. He need not be imaginative, but neither must he be hidebound, for it is up to him to translate a vision into an actuality, or else decide definitely that to do so is impracticable. This expert must have a large staff of chemists, physicists, engineers, physicians, mechanics and others at his beck and call, so as to carry new ideas to their completion.

The next man to take over is the man in whose hands the invention is to be placed. In commercial life we call him the distributor; in war he is the military officer at headquarters. It is he who must determine how the invention fits into his task at the front and work out the details of its proper application. Had a gas best be ejected from projectors brought close to the enemy's lines, or should it be put into shells? Is it advisable to disguise the odor of a gas by the admixtures of other gases? These are questions on which his decision should be final. This officer must be a man of intelligence, for it is up to him to either carry out new ideas or else pass them back to the laboratory to strengthen them for actual combat use, but his authority should not be allowed to extend beyond these specialized tasks.

The fourth type of mind is that of the general director who has before

him an over-all picture of the entire war and whose word alone can release the invention. His judgment, not that of the military staffs or any other groups, should decide if, when and how a new weapon is to be put to practical use. If he fails, the invention fails, no matter how meritorious it may be *per se*. The German generals should not have shouldered a responsibility that properly belonged to a type of mind they did not possess.

* * *

The great achievement of chemistry in the first World War was the lesson we learned—or should have learned—how to utilize new chemical ideas correctly. Gases may or may not play a prominent part in our present conflict, but other chemical inventions may take their place, carrying with them that element of surprise which is so essential to military success. If such an invention should be brought forth, it will undoubtedly be developed and used with full consideration of the lesson the Germans taught us unwittingly by their abortive gas attack at Ypres almost thirty years ago.

Above all, of course, the first World War confirmed what the Civil War had indicated—that war has become an enormous business and that its direction should no longer rest exclusively on the military branch of the government; strategy, arms and manpower have ceased to be the only means by which war is waged. Each nation needs in addition much other new equipment, such as a research department—scientists. But equally important is a Board of Directors to co-ordinate all branches and infuse into the whole structure the shrewdness, experience and all-around brainpower without which no Big Business can be successfully conducted.

III

THE PRESENT WORLD WAR

Now that we are in the midst of the second World War, what is the setup among chemists for support of the war effort? Have we organized our forces so that they can be and are being utilized in the best possible manner?

I wish I could answer this question in the affirmative.

The top government agency created for scientific war work is the Office of Scientific Research and Development, headed by Dr. V. Bush, president of the Carnegie Institute of Washington. This office can both initiate war projects or solve them; in practice it also functions in an

advisory capacity. Much actual work is being performed under the direction of the National Defense Research Committee, of which Dr. James B. Conant, president of Harvard University, is chairman. This Committee has two chief divisions pertaining to our line of work, that of chemistry and physics; organic problems are in charge of Dr. Roger Adams of the University of Illinois, inorganic and industrial chemical matters are under the direction of W. K. Lewis of the Massachusetts Institute of Technology. The National Inventors Council, under C. F. Kettering, is designated to sift novel thoughts submitted to it. Some problems, which are military secrets, have been assigned to government controlled laboratories; there is no doubt that these tasks are being handled well, and under fine leadership.

So far, so good. What we need next is a complete roster of all chemical talent in the country; such a roster would make the over-all picture look promising. Right here, however, is where the first flaw begins to show. Our national roster is not complete, nor nearly so; yet, without a complete card index, our top agencies are like an army without an inventory of its manpower. An incomplete list of our chemical talent is about as useful as a telephone directory with half its pages missing. In our directory, I am afraid, even the information that has been listed is not sufficiently accurate.

The preparation of a complete roster to cover our entire chemical brainpower must be based on two indispensable conditions. For one, we must have a questionnaire which is worded right; second, this questionnaire must reach everyone who has useful knowledge or ability. I regret that, in my opinion, neither of these two conditions has been met by the national questionnaire nor any others I have seen.

The questionnaire sent out by the American Chemical Society in October 1940 to form part of a "National Roster of Scientific and Specialized Personnel", and sub-titled "Jointly Administered by National Resources Planning Board and United States Civil Service Commission", inquired thoroughly into routine qualifications; in fact, it bore a close resemblance to an application blank. Much stress was put on scholastic background, publications and similar matters, when it might have been advisable to go more deeply into qualities particularly useful in war, such as chemical work performed during the last war and, still more essential, into the

type of mind possessed by the registrant, whether inventive, inquisitive, supervising or routine. The statistical information derived from a roster compiled by present methods is scarcely adequate to allow an opinion of a man's capacity in a national emergency. We may learn from it that a man's height is five foot eight, but we do not learn if he is resourceful; we may find that he can read French, but we wonder if he is persevering or tires easily. We are informed how old he is, but not whether he is an organizer or a routine worker. At a time when speedy chemical action may be as decisive as in a commando raid, the questionnaire digs into positions held in the past, instead of asking, "What can you do *now,* and where do you think you fit in best?"

All in all, the picture of the registrant that emerges from this national questionnaire is far from illuminating.

The gravest fault I find with this questionnaire, however, is that it did not reach and was not designed to reach everyone willing and able to render chemical service. Neither the American Chemical Society nor other organized groups of chemists comprise all members of the profession. Some independent thinkers—and they are not the least valuable—shy away from membership in any group; others are staying on the sidelines for reasons which do not matter. Fact is that many chemists do not belong to existing groups, and so long as they are not included in questionnaires, our rosters will remain incomplete. A close co-ordination of all our mental resources means regimentation, voluntary and temporary, but regimentation nevertheless; and unless regimentation is thoroughgoing it is a failure. I believe therefore that a special effort should be made at once to add to our home front all men of chemical training or ability who do not belong to organized chemical groups. Their patriotism is as unquestioned as ours, and they will no doubt cheerfully join us, if and when approached.

Furthermore, we cannot afford to overlook those who have no chemical degrees or formal schooling. Some of our best inventive minds received little or no college training, but have within them that spark which no amount of education can supply. Heaven help us if we close our doors to the Thomas Edisons and William Hoskinses, who never saw the inside of a college. In war time the emphasis is on achievement, not on learning and degrees. When we need a war song, we turn to the man who can write a tune, whether or not he has a diploma from a

musical academy. On the battlefield a sergeant who can move a gun across a swamp is worth ten officers who know Napoleon's Egyptian campaign by heart. One of the finest chemists with whom I have worked graduated from a little-known pharmaceutical college; and I have two men on my staff who never had more than high school training, but whose tangible achievements have made history in their particular field. One of our partially trained chemists has worked out a special oil which increases its technical value manifold. Yet, he has no college degree, and for obvious reasons his work has not been and probably will not be published. If he were to fill out a questionnaire, the column "Publications" would remain blank, thus creating an erroneous impression. Incidentally, none of the three men I have mentioned belongs to the American Chemical Society or to any other chemical organization; their names are on no roster, local or national, nor have they been given any opportunity to register.

This leads us to another weak spot in our armor. A tendency prevails in some circles to undervalue our collateral artisans. Nevertheless, without them the industrial chemist would be helpless. I once had a foreman who could take a few pipes and couplings and turn them into almost any kind of apparatus I needed. I would like to see him on the roster. Perhaps we ought to enlarge the circle of our co-workers still further. I have known ordinary laborers, whose power of observation and interest in their work has been responsible for vast improvements. This elite of workmen are potential shock troops of industry, and in war time should be placed where they can do the most good. They should no more be allowed to work in non-essential lines than a chemist should be permitted to drive an army truck.

A new questionnaire, recently prepared by the Defense Committee of the Chicago section, American Chemical Society, contains two questions that intrigue me:

1. Are you of an inventive turn of mind? What have you invented? List even little improvements you have sponsored.
2. Give names and addresses of people you know (not members of the Chicago section) with unusual ability in any collateral work.

At last we are getting somewhere. Not only will Chicago obtain essential information from its own members by asking these pertinent questions, but it will create a real census of many other worthwhile

minds in our line of work. Chicago will be able to put its fingers on those who possess unusual ability in collateral fields, whether it be glass blowing, mechanics, photography, repair work or any of the other talents and skills that are called into play in industrial war work.

Nothing that I have said should be misconstrued into an expression of disrespect for pure chemistry. Many problems, if they are to be solved, call for the highest kind of chemical training and require large, well-equipped laboratories. Cracking processes or condensation plastics could not have been developed by poorly trained chemists in basement workshops. Germany never would have achieved her early superiority in dyes and pharmaceutical products without an army of well-schooled men; nor could we have accomplished what we have done in the last twenty-five years without equally fine research chemists and organizations On the other hand, we should recognize that many problems can well be attacked by practical men with the meager means at their disposal and by simple and direct methods. With the growth of chemistry, subdivisions among chemical workers have developed both vertically and horizontally; horizontally—in different fields; vertically—different grades of men in each field. Like in our armed forces, there should be no feeling of superiority or jealousy between different branches of the service, or between the officers and soldiers in each of them. Just as the Army, Navy and the Air Force, and within them all personnel from generals to kitchen police, must co-operate to the fullest extent, so pure scientists, industrial chemists and practical workers in all chemical lines must join wholeheartedly in their efforts to achieve the best results. To disregard this principle is to nullify everything we are trying to accomplish.

It is highly regrettable that we have not proceeded very far beyond the creation of the Office of Scientific Research and Development and the National Inventors Council. What we need badly are local organizations throughout the United States to supplement those of national character so as to put a broad foundation under them.

In this respect remarkable work has been done by Robert C. Brown, Jr., a patent attorney of Chicago. He recognized the need of technical organization for our war effort as early as 1940 and, almost single-handed, translated his ideas into accomplishments, by founding the Associated Defense Committees of the Chicago Technical Societies, in

which twenty-three technical and engineering bodies are represented. Over seven thousand scientists, technologists and production engineers in the Chicago area now co-operate through a committee of delegates. A working plan for complete co-operation between the local office of the War Production Board, the Chicago ordnance district and other Government agencies on one side and the Associated Defense Committees on the other is already partially in operation, with Mr. Brown furnishing the connecting link through his appointment as Consulting Director of the Technical Development Section of the Chicago Region of the War Production Board. This gives the Associated Defense Committees at least a semi-official status and means an important step in the right direction.

Milwaukee and South Bend also have organized Associated Defense Committees, and plans are under way to form similar committees all over the United States. Eventually a National Associated Defense Committee will assume leadership of the entire movement and co-ordinate the efforts of the local sections.

That all this important work should have been left to the unselfish patriotism, the vision and the energy of one man, is something I admire, but do not understand. While he has accomplished a Herculean task, we as a country still find ourselves far from our goal. We do not want to achieve a perfect national organization of chemists and other scientific or technical brains after the war is over. We want it now and should have wanted it yesterday and the day before yesterday. No matter how well single localities may be functioning, their numbers are puny when we consider the picture as a whole. Wars are won by armies, not by isolated units.

Why no national organization of this kind has been formed to extend fully into local spheres, I do not know. We have before us the example of the Army with its local draft boards, and of our political parties with networks covering each precinct in every district. Unless we bring co-operation of all technicians likewise down to the grass roots, we shall have fallen short of the primary requisite of our duty; we shall have failed to mobilize our full power, and this means that we shall be unable to put it to concentrated use when most needed.

Local boards must be created immediately, if we are not going to be too late, and they should be organized after a standard pattern. Uniform rules must necessarily be worked out at headquarters. Questionnaires should be drawn up with the utmost care and with appeal to our

three distinctive groups, the scientific chemist, the industrial chemist and the practical man. I would hold each local group responsible for enrolling all workers within its district. I further recommend that government inspectors call at all plants to insure complete enrollments. So far as chemists are concerned—I am using the word in its widest sense—we are still trying voluntary co-operation; but in every previous war voluntary systems have given way to enforced draft, because the voluntary systems have never worked satisfactorily in the long run. Had we not best anticipate the inevitable? Time is getting short.

The present war has not yet produced anything startlingly new from the chemist's point of view. Nevertheless, there is plenty of chemical work in sight. Among many other things we must now, strangely enough, do what German chemists had already learned to do in the last war—work out substitutes. Twenty-five years ago we had command of the seas and the world's resources, while Germany was blockaded. Today it is we who are blockaded in regard to some vital war materials. Hence, American chemists are called upon to use their ingenuity to supply the country with substitutes.

I use the word "substitutes", because it is generally used; but it is not a desirable expression, smacking as it does of the German word *Ersatz;* it carries with it an overtone of disdain, an implied apology, an intimation that what we are offering is something to be used only until something better is developed. Yet, a substitute may be better than the original article, as when we use silver in place of copper. What we are really looking for are not substitutes at all, but *replacements.* This word carries no stigma, and we all understand that a replacement article may be inferior, equal to, or better than the standard material.

This replacement question needs much clarifying. Most of all, it should be generally understood that a replacement product need not be identical with, or even similar to the article it replaces; all it is expected to do is to answer the same purpose.

"Is Oiticica Oil a substitute for Tung Oil?" I have been asked time and again.

"Is a detective story a substitute for a movie?" I have countered. "If you want a couple of hours of light entertainment, yes; if you want to hold a girl's hand, no.'

A pair of cotton stockings is not a substitute for silk hosiery, but a replacement, better in some respects, worse in others. As a dessert,

apple pie may be a replacement for ice cream, unless you are looking for something to cool your insides. I think all chemists have a clear picture of the issue, but the general public needs enlightenment; for once this elementary analysis of the substitution problem is understood, many questions, now hazy in the public mind, will lend themselves to more intelligent discussion. Take the subject of "rubber substitutes", for instance. The daily press is full of it and treats the question as if rubber substitutes, meaning the duplication of natural rubber by synthesis, were the sole answer to the problem. We hear that the total consumption of rubber in the United States is 800,000 tons, and therefore it is taken for granted that 800,000 tons of synthetic rubber must be produced to re-establish the normal balance between production and consumption; even the Baruch-Conant-Compton report apparently takes this view. Yet, I wonder if events will not prove that those who subscribe to it have missed a salient point. If everyone understood that what we must do is replace rubber, not duplicate it, many of our experts might revise their figures. Rubber is used for any number of purposes, from bathroom mats and dress shields to the inner tubes of tires. But everyone knows that a bathroom mat can be replaced—not substituted—by a cotton rag; in dress shields oiled silk will do very well; but for inner tubes we probably will need natural or synthetic rubber.

What becomes of our 800,000 tons of synthetic rubber when we look at the situation with a view of replacement instead of substitution? Let us assume for argument's sake that normally one per cent of all rubber goes into bathroom mats and one per cent into dress shields and other sanitary accessories; by replacing it with cotton rags and fabrics impregnated with drying oils, respectively, we already have cut these 800,000 tons by 16,000 tons a year. Does it not seem reasonable to think of replacement in other lines where rubber is used now, before burying ourselves in a statistical avalanche?

Here is where our chemical organization could function rapidly and successfully. The mere breaking down of the rubber question into components, emphasizing replacement rather than substitution, would make the whole problem appear at once much less formidable. The National Defense Research Committee, with the help of all local committees, should separate all uses of rubber into special groups, with a clear analysis of the purposes for which each article serves. The more

thorough the subdivision, the more useful it will be. We know that rubber is by no means an all-around perfect material. It is affected by sunlight, heat, air, oil, steam. Many of its good qualities do not matter at all for some purposes; neither bathroom mats nor dress shields have to snap back when stretched—and there is no reason why they should be stretched. Rubber has been used for many articles as a matter of habit or on account of price. For purposes of replacement all that is necessary is to draw up intelligent and thorough specifications for the proper material wanted, without mentioning rubber at all, and many problems that look difficult will become simple. What we need for dress shields, for instance, is not rubber, but a waterproof material that can be used to impregnate a fabric without damaging it; it must be light in weight, reasonable in price and resistant to the excretions of the human body. That is all. A properly oiled fabric will not only answer these specifications, but may outperform rubber. I am willing to go on record that when this war is over, rubber will not come back into many fields in which it has reigned supreme up to now. Like other undisputed champions, it may lose its crown, once its supremacy is seriously challenged.

An intelligent and minute subdivision of the uses to which rubber is put and for which replacement is desired, is essential. Take the subject of rubber gaskets, for example. Entirely different specifications will have to be drawn up for gaskets used in plumbing and those used on fruit jars; but even the specifications for fruit jar gaskets will differ according to what is inside the container. A jar containing pickles will call for a type of gasket different from a jar containing mayonnaise. The great advantage of a thorough subdivision is that each replacement material need only cover a small range, and that within this small range it may easily be better than rubber, without possessing any of the qualities for which rubber is unique. Let us remember that a good shortstop need only be a good fielder and batter; it does not matter whether he is also a good golfer, or whether he can speak Portuguese.

The proper subdivision of our replacement problems is one of the principal tasks for our organized chemical forces, wherever a replacement problem must be attacked. After that it is a matter of distributing the problems into small fractions that are not unwieldy. Each subdivided problem will naturally go to those specialists whose knowledge

seems most adaptable for any particular goal. The development of a genuine rubber substitute, in the sense of a synthetic duplication, calls for highly trained research chemists commanding big resources; but the development of replacement products calls for chemists of all kinds, in fact, for technical men of all kinds. Once the rubber question is broken into fragmentary problems which can be easily understood by laymen, it would also be criminal folly to underestimate the service that can be rendered by the intuition, experience and skill of those who are versed in related arts. Excellent solutions may easily spring from individuals who have no knowledge at all of rubber itself.

What holds good for the rubber problem holds, of course, equally for many other shortages with which we are beset; but as the parallelism is obvious, a detailed discussion of other materials is superfluous.

* * *

Considerable dissatisfaction exists among many American chemists, because their energy and patriotism has not been harnessed to obviously pressing national needs. Chemists are aquiver to use their ability in the war effort; I am as sure of it as I am that our soldiers are eager to get into battle. Yet, many capable chemists are standing by with nothing worthwhile to furnish them an outlet for their enthusiasm. Is everything chemical in so perfect a condition that we can afford to leave all this potential ability and experience idling around?

Perhaps more problems would be available if we were allowed to hunt them up ourselves rather than wait for the military men to bring them to us. If we chemists were better informed about what is going on at the front, we might be able to initiate new ideas, possibly even one as revolutionary as the first German gas attack. The trouble as I see it is not that we chemists will fail the Army men when they come to us asking questions; the trouble is that they may not know what questions to ask us, and we, ignorant of the situation, are too uninformed to help them.

Let us assume that certain important war materials are being affected by the heat of the Sahara or the fog of the Aleutians. The Army sends out an SOS call; it goes to our National Defense Research Committee, which in turn will immediately formulate the problem into chemical terms and—after completion of the proper setup—will send it to local

boards for urgent action. But meanwhile much time will have elapsed and considerable damage may have been done; for most likely the Army's call will not be sent out until a serious fault has already developed.

In order to expedite the work, or perhaps prevent harm before it has made much headway, why not have chemical observers at our fronts? We have press correspondents, why not chemical scouts? It would be their duty to note the conditions under which military equipment is used in the tropics or in the arctic, and they may advise preventive rather than remedial steps. Even with a complete organization of our chemical forces at home we must, under existing conditions, cross each bridge when we reach it—if we have a bridge. By receiving advance notice of impending trouble, however, outlined to us by trained observers, we could save considerable time and, conceivably, even prevent a military disaster.

Admittedly, complete confidence in military matters can only be given to a select few; but there is no reason why chemists should not be included among them. The more we chemists know about military matters, the more readily we can co-operate. The German professor who suggested the gas attack at Ypres was not asked for it; but he saw for himself that trench warfare was tending toward an interminable stalemate, and he offered chemical means to overcome it. Presumably, our chemical scouts may likewise originate by themselves chemical measures of either an offensive or defensive nature, which could have a decisive influence on the outcome of the war. So long as we are satisfied to do no more than supply chemical first aid, we shall play a secondary part. Chemists can do better than that, but in order to do so, they must be given an opportunity to be more than advisers.

When and if our organization is functioning smoothly, problems will be submitted to our local boards. Some of these problems will be of a confidential nature, and care will have to be taken that only men are put to work on them whose loyalty is beyond question. I can visualize many other problems, though, which are no secrets and could be posted publicly, so as to give everyone an opportunity to put his brain and skill to work. Let these notices appear in thousands of places, in laboratories, factories, post offices. Or are we too proud to let people know that we are in need of certain improvements? Everybody knows now that we are short of chromium, tungsten, rubber. We are not too

proud to call for money in form of bonds; why shy at technical contributions? Co-operation between workers and managements has already produced splendid results. Is there any reason why this co-operation should not be put on a broader basis, including not only working conditions, but also matters of warfare?

* * *

This, then, is the setup I envision to accomplish a complete mobilization of our chemical strength.

First, a supreme chemical council to govern all war work. It should have representatives from all chemical branches, scientists, industrial chemists, practical men, and be subordinated only to a National board of directors, provided such a board exists or will be created.

Second, a large number of trained chemical scouts, keen, imaginative and experienced. They are to gather at the source whatever war problems present themselves, offensive, defensive or remedial.

Third, a nation-wide roster to include all chemical talent, college-trained or not, both inside or outside existing chemical organizations.

Last, chemical groups covering each territory, modeled after a uniform pattern worked out by the national supreme council; these local boards to be in contact with each other as well as with headquarters and to be associated in turn with working groups in collateral fields.

With such a setup the handling of all chemical problems will be greatly simplified and their solutions hastened. We shall then not only answer questions asked of us, but our scouts at the front will originate questions and formulate them better than would be the case if the reports came to us through military channels.

I have so far spoken mainly of problems submitted to chemists for solution and not of ideas that may originate in chemists' minds. Ideas of this kind are now being taken care of through the National Inventors Council and need not concern the National Council or the local boards.

* * *

It is now nearly a year since we were forced into war. An organization of all chemical ability in the country is an urgent necessity. Many chemists are convinced that organization has not proceeded far enough and are unhappy because they feel they are not being given an opportunity to put their shoulders to the wheel. It is for these reasons that I am submitting my suggestions; they may not be the best approach

to the goal, but they should furnish a basis for a discussion on how to best utilize our tremendous chemical power, second to that of no other country on the globe, but one which must, like all our other resources, be fully employed.

The Civil War was business, the first World War was Big Business, and the present war is Super Business of such gigantic proportions that it almost surpasses comprehension. But it is still business. The Germans have learned their lesson, and they have a Board of Directors, whether or not it functions under that name. That shrewd businessman, who would have used poison gas properly in 1915 to win the first World War, is no longer absent from their council tables. Who else would have suggested building cardboard tanks to be left stranded on the Austrian roads and in the streets of Prague so as to entrap the gullible governments of England and France into a belief that all German equipment was of inferior quality? It is he who has set up an advertising (propaganda) department that works with diabolical ingenuity. His handiwork is visible in a thousand little tricks, none of them calling for genius or even learning, but all calling for shrewdness and cunning. In this war, for instance, the Germans did not waste their surprise weapons on small objects; when they played their parachute trump, it took Holland.

Some day our over-all management of this war will meet the well-nigh perfect German business machine with a wholly perfect American counterpart. Then everything will be well; as an integral part of the nation's organized brainpower we shall know where we fit in and how we can do our share to achieve victory.

In the Civil War three chemists kept the South in the running until the end; one chemist in the North made the United States independent of the most critical foreign material. In the first World War, a German chemist almost decided the issue in favor of his country through one brilliant thought. Can we, at this critical time, afford to toy with our chemical potentialities and act as if we were preparing for a war five years hence? Our enemies have had the initiative in every theater of this war so far, for reasons that may or may not have been beyond our control. But we have no excuse whatever for letting the initiative slip from our hands in the chemical field; it is an even race, unless we choose to handicap ourselves by dawdling or undue optimism.

We American chemists are quantitatively superior and qualitatively at least equal to the chemists of Germany. If we let them beat us through better organization, we shall have no one to blame but ourselves.

References. I. The Civil War

1 Rhodes, Hist. of U. S. Vol. V. pp. 390-394, The Macmillan Company, N. Y. 1919. Miller, Photogr. Hist. of the Civil War, Vol. V. p. 161, The Review of Reviews Co., N. Y. 1912.

2 Jefferson Davis, Rise and Fall of the Confederate Government, V. 1, p. 477.

3 Photographic History of the Civil War, V. 5. Jefferson Davis, Rise and Fall, pp. 316-317 and 475.

4 History of the Explosives Industry in America by VanGelder & Schlatter, New York, Columbia University Press, 1927, pp. 107-118.

5 DuPont. One Hundred and Forty Years, pp. 90-99, by Wm. S. Dutton, Chas. Scribner's Sons, 1942.

6 E. I. DuPont de Nemours, A History, Houghton Mifflin Company, 1920, pp. 82-99.

7 DuPont, One Hundred and Forty Years. E. I. DuPont de Nemours, A History.

Willard Curtis Thompson

It is with deep regret that THE AMERICAN INSTITUTE OF CHEMISTS records the death of Willard Curtis Thompson, professor of chemistry at Lee Junior College, Goose Creek, Texas.

Dr. Thompson was born on September 15, 1894, at Marion, Kansas, and obtained the A.B. and M.S. degrees from the University of Kansas, followed by the Ph.D. degree from the University of Texas. From 1918 to 1923, he served as a chemist for several industrial concerns. From 1923 to 1927, he was a professor of chemistry at Daniel Baker College and then tutored in chemistry for a year at the University of Texas. He was junior research fellow of the American Petroleum Institute from 1928 to 1930. In 1932 he taught at Georgia State College for men at Tifton, Georgia, followed by consulting work at Tehuacana, Texas, and later was professor of chemistry at Lee Junior College, where he remained until his death. Dr. Thompson was the author or co-author of several technical publications on the subjects of "The Synthesis of Isothiourea Ethers", "An Investigation of the Bases in the Kerosene Distillate of California Petroleum", "Nitrogen Compounds and Petroleum Distillates", etc. He specialized in organic chemistry, analytical chemistry, foods and the fermentation industry, petroleum, and lubricants. He was a member of Alpha Chi Sigma and the American Chemical Society. He joined THE AMERICAN INSTITUTE OF CHEMISTS in June, 1930.

COUNCIL

OFFICERS

President, Gustav Egloff
Vice-president, Donald Price
Secretary, Howard S. Neiman
Treasurer, Walter J. Murphy

COUNCILORS

E. R. Allen
Donald H. Andrews
Frank G. Breyer
Stuart R. Brinkley
Harry L. Fisher
Charles N. Frey
Frank O. Lundstrom
Robert J. Moore
Foster D. Snell
W. D. Turner

CHAPTER REPRESENTATIVES

New York	*Niagara*	*Philadelphia*	*Washington*
Marston L. Hamlin	A. W. Burwell	Gilbert E. Seil	Albin H. Warth

September Meeting

The 192nd meeting of the National Council of the American Institute of Chemists was held on Thursday, September 3, 1942, at The Chemists' Club, 52 East 41st Street, New York, N. Y., at 6:30 p.m.

Dr. Gustav Egloff presided. The following officers and councilors were present: Messrs: M. L. Crossley, G. Egloff, H. L. Fisher, C. N. Frey, M. L. Hamlin, R. J. Moore, W. J. Murphy, H. S. Neiman, D. Price, G. E. Seil, and F. D. Snell. Dr. W. D. Turner and Miss V. F. Kimball were present.

Dr. Egloff stated, "This evening we lack the presence of a most active member of our Institute, Dr. Knight, who was here with us at our preceding meeting on June tenth. Unfortunately, he has passed on, as we all know. Word has been sent to his family expressing our sympathy for the passing of a great chemist who so ably filled a great task today in the world at war." Following these words, the Council observed a brief period of silence in honor of Dr. Knight.

The minutes of the previous meeting were approved.

The Treasurer's report, showing a total of cash on hand and in bonds, of $5212.06, was read and accepted.

The Secretary reported that we have at present a membership of 1748.
The Secretary announced that the following members were elected by Council and Committee action during the summer:

FELLOWS:

Bloch, Herman S.
(1942), *Chief Chemist,* Universal Oil Products Company, Chicago, Ill.

Carrick, Leo L.
(1942), *Professor of Industrial Chemistry* and *Dean of School of Chemical Technology,* North Dakota Agricultural College, Fargo, N. D.

Chenicek, Joseph A.
(1942), *Research Chemist,* Universal Oil Products Company, Chicago, Ill.

Cook, Charles H.
(1942), *Vice-president, Chief Chemist,* The Sterling Varnish Company, Haysville, Penna.

Danforth, Joseph D.
(1942), *Research Chemist,* Universal Oil Products Company, Riverside, Ill.

Davis, Richard F.
(1942), *Chemist,* Universal Oil Products Company, Chicago, Ill.

Dryer, Charles G.
(1942), *Research Chemist,* Universal Oil Products Company, Riverside, Ill.

Dull, Malcolm F.
(1942), *Chairman, Department of Chemistry,* De Paul University, Chicago, Ill.

Friedman, Bernard S.
(1942), *Research Chemist,* Universal Oil Products Company, Riverside, Ill.

Fulton, Ralph G.
(1942), *Development Chemist,* Bakelite Corporation, Bloomfield, N. J.

Greenhood, Henry W.
(1942), *Process Engineer,* Bakelite Corporation, Los Angeles, Calif.

Hanson, Norman D.
(1942), *Chemist,* Bakelite Corporation, Bloomfield, N. J.

Henry, Guido R.
(1942), *Chemist,* E. I. du Pont de Nemours and Company, Philadelphia, Pennsylvania.

Kassel, Louis S.
(1942), *Assistant Manager,* Universal Oil Products Company, Chicago, Ill.

Katzman, Morris
(1942), *Research Chemist,* Emulsol Corporation, Chicago, Ill.

Kline, Gordon M.
(1942), *Chief Technical Editor,* Organic Plastics Section, National Bureau of Standards, Washington, D. C.

Lefferdink, Theodore B.
(1942), *Research Chemist,* Bakelite Corporation, Bloomfield, N. J.

Lenz, William J.
(1942), *Research and Consulting Chemist,* Lenz Industrial Testing Laboratories, Louisville, Ky.

Linn, Carl B.
(1942), *Research Chemist,* Universal Oil Products Company, Riverside, Ill.

Marshall, Walter R.
(1942), *Department Head,* Resin-Varnish Division, The Bakelite Corporation, Bloomfield, N. J.

Mattox, William J.
(1942), *Research Chemist,* Universal Oil Products Company, Riverside, Ill.

Mavity, Julian M.
(1942), *Research Chemist,* Universal Oil Products Company, Chicago, Ill.

McCord, Andrew T.
(1942), *Research Engineer,* Sherwin-Williams Company, Gloucester, N. Y.

Parks, W. George
(1942), *Professor of Chemistry,* Rhode Island State College, Kingston, R. I.

Pickering, Harry S.
(1942), *Vice-president and Technical Director,* Chemical Manufacturers of Florida, Inc., North Miami, Fla.

Pines, Herman
(1942), *Research Chemist,* Universal Oil Products Company, Riverside, Ill.

Rice, Oscar K.
(1942), *Associate Professor of Chemistry,* University of North Carolina, Chapel Hill, N. C.

Schaad, Raymond E.
(1942), *Research Chemist,* Universal Oil Products Company, Chicago, Ill.

Schmerling, Louis
(1942), *Research Chemist,* Universal Oil Products Company, Riverside, Ill.

Segal, Carl F.
(1942), *Chemist,* Emulsol Corporation, Chicago, Ill.

Shutt, R. S.
(1942), *Supervisor Chemical Research,* Battelle Memorial Institute, Columbus, Ohio.

Sward, George G.
(1942), *Chemist,* National Paint, Varnish and Lacquer Association, Inc., Washington, D. C.

Todd, James D.
(1942), *Vice-president and General Manager,* Kentucky Color and Chemical Company, Louisville, Ky.

Venger, Mildred
(1942), *Librarian,* Universal Oil Products Company, Riverside, Ill.

ASSOCIATES:

Bourland, James F.
(A.1942), *Research Chemist,* Calco Chemical Division of American Cyanamid Company, Bound Brook, N. J.

Brouillard, Robert E.
(A.1942), *Research Chemist,* Calco Chemical Division of American Cyanamid Company, Bound Brook, N. J.

Dhein, Leonard H.
(A.1942), *Research Chemist,* Calco Chemical Division of American Cyanamid Company, Bound Brook, N. J.

Ebel, Robert H.
(A.1942), *Research Chemist,* Calco Chemical Division of American Cyanamid Company, Bound Brook, N. J.

Granis, Michael
(A.1942), *Research Chemist,* Calco Chemical Division of American Cyanamid Company, Bound Brook, N. J.

Meunier, Alfred C.
(A.1942), *Research Chemist,* Calco Chemical Division of American Cyanamid Company, Bound Brook, N. J.

Nield, Cyril H.
(A.1942), *Research Chemist,* Calco Chemical Division of American Cyanamid Company, Bound Brook, N. J.

Pinkston, John T., Jr.
(A.1942), *Research Chemist,* Universal Oil Products Company, Riverside, Illinois.

Smith, Whitfield W.
(A.1942), *Chemist,* Baker and Company, Newark, N. J.

Thompson, Frederick B., Jr.
(A.1942), *Sanitary Chemist,* Fourth Corps Area Laboratory, Fort McPherson, Ga.

White, Abner
(A.1942), *Administrative Officer,* Johnson and Johnson Gas Mask Division, Chicago Chemical Warfare Procurement District, Chicago, Ill.

JUNIORS:

Alexander, Mary L.
(J.1942), *Librarian,* Universal Oil Products Company, Chicago, Ill.

Anderson, Eleanor G.
(J.1942), *Library Research,* Universal Oil Products Company, Chicago, Ill.

Boehm, Adolph A.
(J.1942), *Chemist,* Bakelite Corporation, Bound Brook, N. J.

Covet, Sylvia
(J.1942), *Patent Department,* Universal Oil Products Company, Chicago, Illinois.

Garty, Kenneth T.
(J.1942), *Research Chemist,* The Bakelite Corporation, Bloomfield, N. J.

Giacona, Nicholas V.
(J.1942), *Control Chemist,* Hammond Paint and Chemical Company, Beacon, New York.

Upon motion made and seconded, the following new members were elected.

ASSOCIATES:

Ducca, Frederick W.
(A.1942), *Chemist,* The Bakelite Corporation, Bloomfield, N. J.

Richardson, Stanley H.
(A.1942), *Chemist,* The Bakelite Corporation, Bloomfield, N. J.

Walters, Linwood A.
(A.1942), *Chemist,* The Bakelite Corporation, Bloomfield, N. J.

JUNIOR:

Pitt, Charles F., III.
(J.1942), *Chemist,* The Bakelite Corporation, Bloomfield, N. J.

Upon motion made and seconded, the following members were elected, subject to a verification of their citizenship and education, to be inspected by a member of the Council:

FELLOWS:

Cahn, Frank J.
(1942), *Research Chemist,* The Emulsol Corporation, Chicago, Ill.

Coutinho, Henri
(1942), *Technical Director* and *Chief Chemist,* Pinaud, Inc., New York, New York.

de Simo, Martin
(1942), *Director of Research and Development,* Great Lakes Carbon Corporation, Chicago, Ill.

Eisenschiml, Otto
(1942), *Manager* and *President,* Scientific Oil Compounding Company, Chicago, Ill.

Haensel, Vladimir
(1942), *Research Chemist,* Universal Oil Products Company, Riverside, Ill.

Joffe, Morris H.
(1942), *Chemist Executive,* The Emulsol Corporation, Chicago, Ill.

Komarewsky, Vasili I.
(1942), *Professor of Chemistry,* Illinois Institute of Technology, Chicago, Illinois.

Mackinney, Herbert W.
(1942), *Research Chemist,* The Bakelite Corporation, Bloomfield, N. J.

ter Horst, W. P.
(1942), *Head,* Organic Research Department, General Laboratories, U. S. Rubber Company, Passaic, N. J.

Tolpin, Jacob G.
(1942), *Chemist in Charge of Survey of Foreign Petroleum Literature,* Universal Oil Products Company, Chicago, Ill.

ASSOCIATES:

Kertesz, Dennis J.
(A.1942), *Research Chemist,* Calco Chemical Division of American Cyanamid Company, Bound Brook, N. J.

Upon motion made and seconded, the following former members were reinstated to Fellow membership:

Grebe, John J.
(1942), *Director of Physical Research,* The Dow Chemical Company, Midland, Mich.

Phillips, Ernest B.
(1942), *Chief Chemist,* Sinclair Refining Company, East Chicago, Ind.

Dr. Price presented a leaflet which he had prepared for membership purposes, and after discussion and suggestions, it was decided to discuss this with several members of the INSTITUTE at the Buffalo meeting of the A.C.S.

A letter from Dr. Northey with reference to the classification of Junior membership was read, and the Secretary was requested to send copies to the Committee on Qualifications for study, together with the comments from members and councilors.

Dr. Egloff announced the formation

of the Chicago Chapter, and upon motion made and seconded, the Secretary was requested to advise this chapter that it is accepted, and that it is to be congratulated. The Secretary was also requested to send the Chicago Chapter copies of the by-laws of the other chapters, and to ask it to submit its proposed by-laws to the Council for approval.

On motion made and seconded, the Treasurer was authorized to refund the usual percentage of dues to the Chicago Chapter, to begin with the dues paid at the beginning of the present fiscal year.

On motion made and seconded, the Chicago Chapter is to be requested to decide what territory it would like to cover in that Chapter.

On motion made and seconded, the vacancy on the Council left by Dr. Knight's passing was filled by the appointment of Dr. W. D. Turner as councilor to fill the unexpired term.

Dr. Egloff presented the matter of the Shell Oil situation, and after discussion and upon motion made and seconded, the Secretary was requested to write to Mr. Ballard and suggest that he get ten members and organize a Chapter of the INSTITUTE in California to establish a group of professional men to which professional problems can be taken.

The Secretary read a letter of appreciation from Dr. Henry F. Muer regarding action taken upon his dues.

Upon motion made and seconded, the resolutions prepared by the Secretary on the death of Dr. Knight were accepted.

Upon motion made and seconded, Dr. W. D. Turner was appointed chairman of the Committee on Licensure.

Upon motion made and seconded, Mr. Walter J. Murphy was requested to look into the matter of obtaining outside counsel on publicity and to report at the next meeting of the Council.

An editorial board was appointed with Mr. Walter J. Murphy as chairman.

The next meeting of the Council was set for Thursday, October 1, 1942.

There being no further business, adjournment was taken.

October Meeting

The 193rd meeting of the National Council of THE AMERICAN INSTITUTE OF CHEMISTS was held on Thursday, October 1, 1942, at The Chemists' Club, 52 East 41st Street, New York, N. Y., at 6:30 p. m.

In the absence of President Egloff, Dr. Donald Price, vice-president, presided.

The following officers and councilors were present: Messrs: E. R. Allen, F. G. Breyer, R. J. Moore, W. J. Murphy, H. S. Neiman, D. Price, F. D. Snell, and W. D. Turner. Dr. E. H. Northey, Mr. L. W. Hutchins, and Miss V. F. Kimball were present.

The minutes of the previous meeting were approved.

A letter from President Egloff was presented with items of INSTITUTE business for this council meeting, as follows:

1. Secretary to write to Dr. Alexander Silverman in connection with the founding of an INSTITUTE Chapter in Pittsburgh.

The Secretary informed the Council that this has already been done.

2. Develop the status of the potential Chapter in California.

After discussion, the Secretary was requested to send the names of all members in California to Dr. Moore.

3. The feasibility and desire of engaging the services of a public relations counsel or company to handle publicity and perhaps to obtain advertising for THE CHEMIST, and to push

an advertising program for THE CHEMIST.

Mr. Murphy, chairman of an Editorial Advisory Board for THE CHEMIST, reported that he had discussed the present problems of THE CHEMIST with the editor, and that the following matters should be clarified by the Council:

(a) Either all present advertising in THE CHEMIST should be dropped, or additional advertising should be secured.

(b) The roster should logically be taken out of the issue series of THE CHEMIST.

(c) If additional advertising is secured, it may be advisable to change the present size and format of THE CHEMIST at the beginning of the next volume number.

Upon motion made and seconded, the Council went on record as favoring the securing of additional advertising.

Upon motion made and seconded, it was decided to publish the next roster in the series of THE CHEMIST as the December issue, and that after this number, the matter of publishing future rosters separately from THE CHEMIST would be again considered.

The matter of publishing news and announcements in the front of the roster was discussed, but left in the hands of the Editorial Board for decision.

The subject of change in format to accommodate advertising was deferred until a later meeting.

Dr. Moore suggested several articles of interest to chemists for possible publication.

A budget for THE CHEMIST was discussed.

(4) Status of the brochure to be worked up by the Secretary on patent laws pending in Washington.

The Secretary reported that he was keeping in touch with the situation and would report fully as soon as definite information is received.

5. Desirability of having a Washington correspondent to abstract or digest briefly the status of potential patent laws, decisions of the Supreme Court, etc., to appear in THE CHEMIST. After discussion, this matter was referred to the Committee on Patents.

6. Status of the new brochure on membership.

Dr. Price reported that he had conferred with Mr. Murphy on the content of this brochure, and that as soon as the material was determined, it would be returned to Mr. Murphy for a distinctive lay-out.

7. Question of the Chicago Chapter territory.

A letter from Dr. Vanderveer Voorhees, Chairman of the Chicago Chapter, was read, which recommended that the Chicago Chapter include Northern Illinois as far south as Springfield; Indiana south to Lafayette, and Wisconsin north to Green Bay. Upon motion made and seconded, this area was approved for the Chicago Chapter.

8. Pan American Chemical Society—Dr. Nabuco, president of the Brazilian Chemical Society expressed the desirability of forming a Pan American Chemical Society, and wishes the coöperation of the INSTITUTE.

Upon motion made and seconded, the Council referred this matter to Dr. Egloff to represent the INSTITUTE, particularly as it refers to the professional status of American chemists.

The Secretary presented a file of letters which had been received from the Qualifications Committee in reply to a letter about membership classification from Dr. Northey. Legally it is not

possible to change the present membership classification, which is a part of the INSTITUTE's constitution, until the next annual meeting, but in preparation for such a change, the Secretary was requested to send copies of these letters to the Councilors for their information. Dr. Moore offered to write a letter on this subject to be included with the others. Dr. Allen expressed hesitancy about changing membership classifications without serious consideration to the requirements of professional status for chemists.

Upon motion made and seconded, the following new members were elected:

FELLOWS:

Allen, Robert A.
(1942), *Chief Chemist,* Nuodex Products Company, Inc., Elizabeth, N. J.

Charlton, Ralph W.
(1942), *Chemist,* Congoleum Nairn, Inc., Kearny, N. J.

Colman, S. Stephen
(1942), *Chemist,* U. S. Rubber Company, Passaic, N. J.

Cook, E. William
(1942), *Research Chemist,* American Cyanamid Company, Stamford, Conn.

Craig, Ralph W.
(1942), *Chemist and Sales Engineer,* Diamond Alkali Company, Painesville, Ohio.

Fiekers, Bernard A., S. J.
(1942), *Chairman,* Department of Chemistry, Holy Cross College, Worcester, Mass.

Frazier, Ralph B.
(1942), *Technical Director,* American Lacquer Solvents Company, Phoenixville, Penna.

Hancock, Henry E.
(1942), *Superintendent,* Sewall Paint and Varnish Company, Kansas City, Missouri.

Manning, Paul D. V.
(1942), *Director of Research,* International Minerals and Chemical Corporation, Chicago, Ill.

Nairne, John I.
(1942), *Sales Engineer,* A. J. Lynch and Company, Los Angeles, Calif.

Schneiderwirth, Herman J.
(1942), *Research Director,* The National Drug Company, Philadelphia, Pennsylvania.

ASSOCIATES:

Imbriani, Warren B.
(A.1942), *Chemist,* The Bakelite Corporation, Bound Brook, N. J.

Kuder, Robert C.
(A.1942), *Organic Chemist,* Standard Oil Company of Indiana, Whiting, Ind.

Lewis, Charles E.
(A.1942), *Chemist,* Calco Chemical Division of American Cyanamid Company, Bound Brook, N. J.

Long, Robert S.
(A.1942), *Research Chemist,* Calco Chemical Division of American Cyanamid Company, Bound Brook, N. J.

Nies, Abby W.
(A.1942), *Research Chemist,* Calco Chemical Division of American Cyanamid Company, Bound Brook, N. J.

Scholz, Theodore F.
(A.1942), *Research Chemist,* Calco Chemical Division of American Cyanamid Company, Bound Brook, N. J.

Upon motion made and seconded, the following changes in rank were given:

Walter J. Beichert, raised from Associate to Fellow.

Herman William Dorn, raised from Associate to Fellow.

Maurice J. Kelley, raised from Associate to Fellow.

Charles W. Weitzel, raised from Junior to Fellow.

There being no further business, adjournment was taken.

Applications for Membership

For Fellows:

Althoff, Carl A.
Chemist, Diamond Alkali Company, Pure Calcium Products Division, Box 407, Painesville, Ohio.

Clingan, Bruce W.
Superintendent Technical Service, The Sherwin Williams Company, Newark, New Jersey.

Greco, William J.
Coördinator of Technical Information, Socony Paint Products Division, Socony Vacuum Oil Company, Inc., Long Island City, N. Y.

Hall, Lloyd A.
Chief Chemist and *Director of Research,* The Griffith Laboratories, Inc., 1415 W. 37th Street, Chicago, Ill.

Harkins, William D.
Andrew MacLeish Distinguished Service Professor, Emeritus, in charge of Surface Chemistry and certain war work, University of Chicago, Chicago, Illinois.

Jacobson, Bernard L.
Chemist, Standard Varnish Works, 2600 Richmond Terrace, Staten Island, New York.

Nee, John W.
Chemist, Roxalin Flexible Finishes, Inc., 800 Magnolia Avenue, Elizabeth, New Jersey.

Peterson, Edwin P.
Research Chemist, National Lead Company, 105 York Street, Brooklyn, New York.

Rinehart, Wilmer T.
Research Chemist, U. S. Gypsum Company, 1253 Diversey Parkway, Chicago, Ill.

Stoppel, Ernest A.
Technical Director, Valspar Corporation, 364 Manhattan Avenue, Brooklyn, N. Y.

Vogenitz, Frederick O.
Plant Superintendent, Integrity Paint Company, 294 State Street, New Haven, Conn.

For Junior:

Formikell, Alec E.
Chemist, General Cable Corporation, Rome, N. Y.

CHAPTERS

Chicago

Chairman, Vanderveer Voorhees — *Vice-chairman,* Hilton I. Jones

Secretary-treasurer, Charles L. Thomas
Universal Oil Products Company
Riverside, Illinois.

The Chicago Chapter will tender a banquet to Professor Vladimir Nikolaevich Ipatieff on the occasion of his seventy-fifth birthday, Saturday, November twenty-first, at which many of the leading scientists of this country will be present. Professor Ipatieff has been carrying on chemical researches in this country for the past twelve years, chiefly in the catalytic field. Previously, he held a position of high scientific esteem in Russia and was a member of the Russian Academy of Sciences. In addition to many foreign scientific honors, he has received the Willard Gibbs Medal of The American Chemical Society.

New York

Chairman, Elmore H. Northey *Vice-chairman,* Paul J. Witte

Secretary-treasurer, A. Lloyd Taylor
Oakite Products Company, 22 Thames Street
New York, N. Y.

Council Representative, Marston L. Hamlin

A dinner in honor of Dr. Gustav Egloff will be given by the New York Chapter on Friday, October twenty-third at The Chemists' Club, New York, N. Y. at 8:30 p.m.

Speakers are: Dr. Robert J. Moore, "Personal History of Egloff, the Author"; Col. George A. Burrell, "Egloff the Petroleum Expert"; Dr. Marston T. Bogert, "Influence of Egloff on the Progress of American Chemistry". Dr. E. H. Northey, chairman of the New York Chapter, will preside. The title of Dr. Egloff's address is "The Struggle for Oil and Its Products."

Niagara

Chairman, L. M. Lawton *Vice-Chairman,* George W. Fiero

Secretary, Margaret C. Swisher
Department of Chemistry
University of Buffalo
Buffalo, New York

Council Representative, Arthur W. Burwell
Carl H. Rasch, *Alternate*

Pennsylvania

Chairman, J. M. McIlvain *Vice-chairman,* Maurice L. Moore

Secretary-treasurer, Clinton W. MacMullen
6650 Large Street
Philadelphia, Penna.

Council Representative, Gilbert E. Seil

News Reporter to THE CHEMIST, Kenneth A. Shull

Washington

President, L. F. Rader, Jr.

Vice-president, Donald H. Andrews *Treasurer,* L. R. Heiss

Secretary, Ernest J. Umberger

207 Albany Avenue, Takoma Park, Maryland

News Reporter to THE CHEMIST, T. H. Tremearne

Council Representative, Albin H. Warth

BOOKS

THE STONE THAT BURNS. The Story of the American Sulphur Industry. By Williams Haynes. *Alfred A. Knopf.* 1942. 845 pp. 6" x 9". $3.75

The acknowledged ability of Williams Haynes to convert a controversial chemical subject into a story of human interest is again evidenced in his book under the above title.

Here is the story of "Frasch, the clever, persistent inventor; of the forceful Swenson; the persuasive Pemberton; the quiet-spoken Seeley Mudd; of smart traders in mineral rights, of rugged financiers who backed sulphur against long odds; of dogged, resourceful engineers who built plants in a sea of sticky gumbo miles from town or railway." It is a record of American perseverence, determination and ingenuity to overcome seemingly impossible barriers raised by nature and by man.

The author has collated the human side of his story from personal contacts with those who in the field and the laboratories worked out the chemical and mechanical problems to success, while the statistical and commercial facts are collected from the records of those who have commercialized the product extracted by various means from its original deposits.

Starting with the first pumping experiments of Herman Frasch in December, 1894, the author wanders logically and chronologically through the winding paths of failure and success to today, a path covered by bewildering, but most interesting facts and figures.

The inception and operation of each corporation inaugurated to take a part in the development of the sulphur industry is described in detail, each being, not only a history of its manufacturing and business operations, but also a personal biography of each person involved therein.

The author calls attention to the importance of sulphur in our everyday lives by stating that its annual consumption is more than thirty pounds for every man, woman, and child in the United States, twice as much as we use of copper, three times as much as of rubber, five times that of tobacco and thirty times that of nickel and follows up these statements by including an appendix containing interesting and valuable statistics regarding the element. A valuable feature of the book to those interested in any particular subject matters discussed is a list of

over three hundred references to their original sources.

Mr. Haynes has taken sulphur from the textbooks on chemistry, and has placed it in a form in which it will find a favored place upon the library table.

AN INTRODUCTION TO ELECTROCHEMISTRY. By Samuel Glasstone; *D. Van Nostrand Company, Inc.* 1942. 6" x 9". 557 pp. $5.00

The author, professor of chemistry at the University of Oklahoma, whose previous work "The Electrochemistry of Solutions" is well-known as a work of reference, has planned this book to provide an introduction to electrochemistry in its present state of development. Little space has been given to theories which have been discarded, and the modern point of view in electrochemistry is stressed, for developments in the past twenty-years have had an important influence on this subject. The activity concept, the interionic attraction theory, the proton-transfer theory of acids and bases, and the consideration of electrode reactions as rate processes have all been incorporated into this book.

The contents include: Chapter I, Introduction; Chapter II, Electrolytic Conductance; Chapter III, The Theory of Electrolytic Conductance; Chapter IV, The Migration of Ions; Chapter V, Free Energy and Activity; Chapter VI, Reversible Cells; Chapter VII, Electrode Potentials; Chapter VIII, Oxidation-Reduction Systems; Chapter IX, Acids and Bases; Chapter X, The Determination of Hydrogen Ions; Chapter XI, Neutralization and Hydrolysis; Chapter XII, Amphoteric Electrolytes; Chapter XIII, Polarization and Overvoltage; Chapter XIV, The Deposition and Corrosion of Metals; Chapter XV, Electrolytic Oxidation and Reduction; Chapter XVI, Electrokinetic Phenomena. References are given. A series of problems follows each chapter. While this volume is not to be considered as comprehensive it is more suitable to the needs of students than would be a book of more detail. Those whose work brings them in contact with electrochemistry will find this book excellent as an introductory text.

CHEMISTRY OF FOOD AND NUTRITION. By Henry C. Sherman. The Macmillan Company. 6th Edition. 1941. 611 pp. 6" x 8½". $3.50.

The sixth edition of this recognized standard book upon the principles of food chemistry and nutrition has brought the rapidly expanding information upon this vital subject up to date, the accomplishment of which has required a rewriting of the major portion of the preceding edition.

The author has interpreted the scientific aspects of foods into a picture of their relative practical applications, their effect upon health and their respective nutritive values.

It is stressed that while each of the elements, carbohydrates, fats, proteins, mineral elements, and vitamins, has its importance in nutrition, it does not function alone but must be considered in mutual combination and coöperation with the others, and the author has clearly set forth the effects of each of these elements as isolates and of the functional results when considered in combination.

One of the most interesting and instructive chapters is that directed to the fate of foodstuffs in metabolism, in which the body chemistry of foods during their digestion is set forth as

purely chemical reactions in which food chemicals are broken down for the formation of those chemical compounds necessary for the proper support of life.

The author has successfully endeavored to present health in chemical formulæ and to explain how these chemical formulæ may be best produced by the use of proper food.

He who commences to read the book from a purely chemical viewpoint, soon finds himself considering his daily diet, and one cannot but conclude that the basic thought of the author was to unconsciously lead his readers into a more beneficial and satisfactory state of health.

Each element of food is treated in detail as to the chemistry, source of supply, and body effect, with suggestions as to its practical application for obtaining its full food value.

A valuable feature of the book is its hundreds of references for suggested readings upon each of the described subjects.

The author states that the book is published primarily to meet the needs of college classes, but it will find its usefulness in a much broader field which includes everyone interested in the effect of food upon health.

The Academic Press, Inc., 125 East 23rd Street, New York, N. Y., announces that a new journal in biochemistry, *Archives of Biochemistry*, begins publication in October. It will publish scientific papers in the fields of proteins, hormones, vitamins, viruses, enzymology, biochemical and biophysical research in chromosomes, metabolism, nutrition, photosynthesis, plant chemistry, organic chemistry as far as related to living organisms, colloid science in its biological application, and chemotherapy. The editorial board consists of: M. L. Crossley, F.A.I.C., American Cyanamid Company; R. A. Gortner, University of Minnesota; F. C. Koch, Armour and Company; C. M. McCay, Cornell University; F. F. Nord, Fordham University; F. W. Went, California Institute of Technology; and C. H. Werkman, Iowa State College. Archives of Biochemistry is to be published bi-monthly in two volumes per year, each volume priced at $5.50.

Irving E. Muskat, F.A.I.C., formerly director of research for the Pittsburgh Plate Glass Company, is now director of research for the Vulcan Detinning Company, Sewaren, New Jersey. He is also establishing an independent company for research and development in synthetic resins.

Professor Harold F. Schaeffer F. A. I. C., formerly head of the Department of Chemistry at Waynesburg College, Waynesburg, Penna., has accepted a teaching and research position at the University of Missouri, where for the past six months he has been engaged in post-graduate work and teaching. He was a member of the faculty of Waynesburg College for the past sixteen years and also served as faculty advisor on student publications.

Robert J. Moore, past president of The Institute, was the guest speaker at the luncheon meeting of the Engineers' Club of New York, October eighth. His subject was "Synthetic Resin Plastics and Particularly Their Engineering Applications."

EMPLOYMENT

Chemists Available

CHEMIST AND MANUFACTURING PHARMACIST. F.A.I.C., Ph.C. Experienced in chemical and pharmaceutical products, foods, cosmetics, and household specialties. Able to handle analytical, research, production supervision, and formulations, as well as bulk compounding. Known for numerous technical publications in the United States and abroad. Draft-exempt. Please reply to Box 123.

TEXTILE CHEMIST. Graduate of University of Caen, France. Wants position in textile field. Please reply to Box 51, THE CHEMIST.

CHEMICAL ENGINEER, F.A.I.C. 36, (3A) 8 years experience chemical production and development. Now employed on design of pressure vessels. Salary $4300. Seeking permanent work in plant as production or project engineer. Prefer location on seaboard or large lake. Please reply to THE CHEMIST, Box 47.

F.A.I.C., COLLEGE PROFESSOR OF ORGANIC CHEMISTRY desires change. Ph.D., publications. Teaching position preferred. Details available on request. Please reply to Box 57, THE CHEMIST.

ANNOUNCEMENT

A new Roster of THE AMERICAN INSTITUTE OF CHEMISTS will be published in an early issue of THE CHEMIST. Every member of the INSTITUTE is requested to fill out and return the coupon below, if he has not already done so, so that he may be listed correctly in our new membership list.

Secretary, THE AMERICAN INSTITUTE OF CHEMISTS,
233 Broadway, New York, N. Y.

Please list my name as follows in the new directory.

Name ....

Business Position or Title ....

Name of Firm ....

Address of Firm ....

NEW BOOKS

Rubber and its Use

HARRY L. FISHER

$2.25

An authoritative and practical treatment. Rubber cultivation as well as development of synthetic rubber compounds. Dr. Fisher received the 1940 Modern Pioneer Award and is president of American Institute of Chemists.

Chemical Warfare

CURT WACHTEL

$4.00

Various types of lethal gases, their development—evaluation and toxicity, as well as treatment, and psychological aspects, etc.

Fluorescent Light & Its Application

H. C. DAKE — JACK DE MENT

$3.00

Latest developments in ultra-violet radiations and uses of ultra-violet light—including chapters on radioactive minerals, etc.

The Cyclotron

W. B. MANN

$1.50

The description of the cyclotron as a source of protons, deuterons, neutrons and the L-particles. Theoretical, mathematical and mechanical aspects.

Forensic Chemistry

HENRY T. RHODES

$5.00

Chemical methods for the use of the criminologist in identification, proof of corpus delicti, counterfeiting—toxic agents—firearms stains.

Anodic Oxidation of Aluminum and its Alloys

DR. A. JENNY

$6.50

A general survey of the electrolytic behavior of aluminum alloys at the anode.

Electrochemistry and Electrochemical Analysis

Vol. I—Electrochemical Theory

H. J. S. SAND

$2.00

Contents—Theories of inter-tonic attraction—Liquio junction potentials—Electrode potentials of half cells—Irreversible Electrolytic processes polarization—et al.

Electrochemistry and Electrochemical Analysis

Vol. II—Gravimetric Electrolytic Analysis and Electrolytic Marsh Tests

H. J. S. SAND

$2.00

Contents—Apparatus and technique of electrolytic deposition—Quantitative disposition and separation of individual metals—Applications to the analysis of industrial alloys—Electrolytic micro-analysis.

Distributed by

THE CHEMIST

233 Broadway New York, N. Y.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, etc. REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912, and MARCH 3, 1933

Of THE CHEMIST, published monthly except June, July, and August at New York, N. Y., for October 1, 1942.

STATE OF NEW YORK }
COUNTY OF NEW YORK } ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Vera F. Kimball, editor, who, having been duly sworn according to law, deposes and says that she is the Editor of THE CHEMIST and that the following is, to the best of her knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Name of	Post Office Address
Publisher: THE AMERICAN INSTITUTE OF CHEMISTS,	233 Broadway, New York, N. Y.
Editor: Vera F. Kimball,	233 Broadway, New York, N. Y.
Managing Editor:	None
Business Manager:	None

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given).

THE AMERICAN INSTITUTE OF CHEMISTS, INC., 233 Broadway, New York, N. Y.

(Non-profit making corporation. No stockholders.)

Gustav Egloff, President, Universal Oil Products Company, Chicago, Illinois.

Donald Price, Vice-president, National Oil Products Company, Harrison, N. J.

Walter J. Murphy, Treasurer, 522 Fifth Avenue, New York, N. Y.

Howard S. Neiman, Secretary, 233 Broadway, New York, N. Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) NONE.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by her.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is——. (This information is required from daily publications only.)

Vera F. Kimball
(Signature of Editor)

Sworn to and subscribed before me this first day of October, 1942.

Dorothy A. Shaninger, Notary Public
(My commission expires March 30, 1944.)